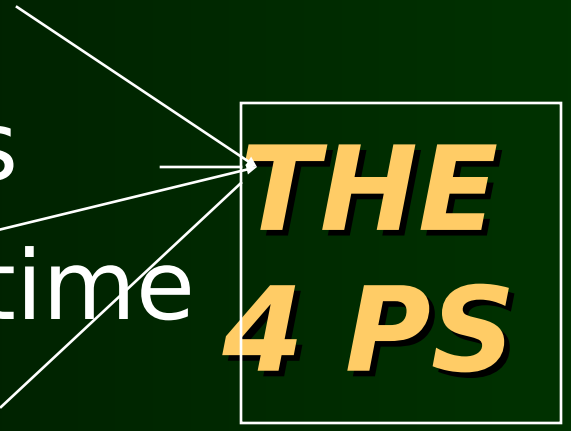
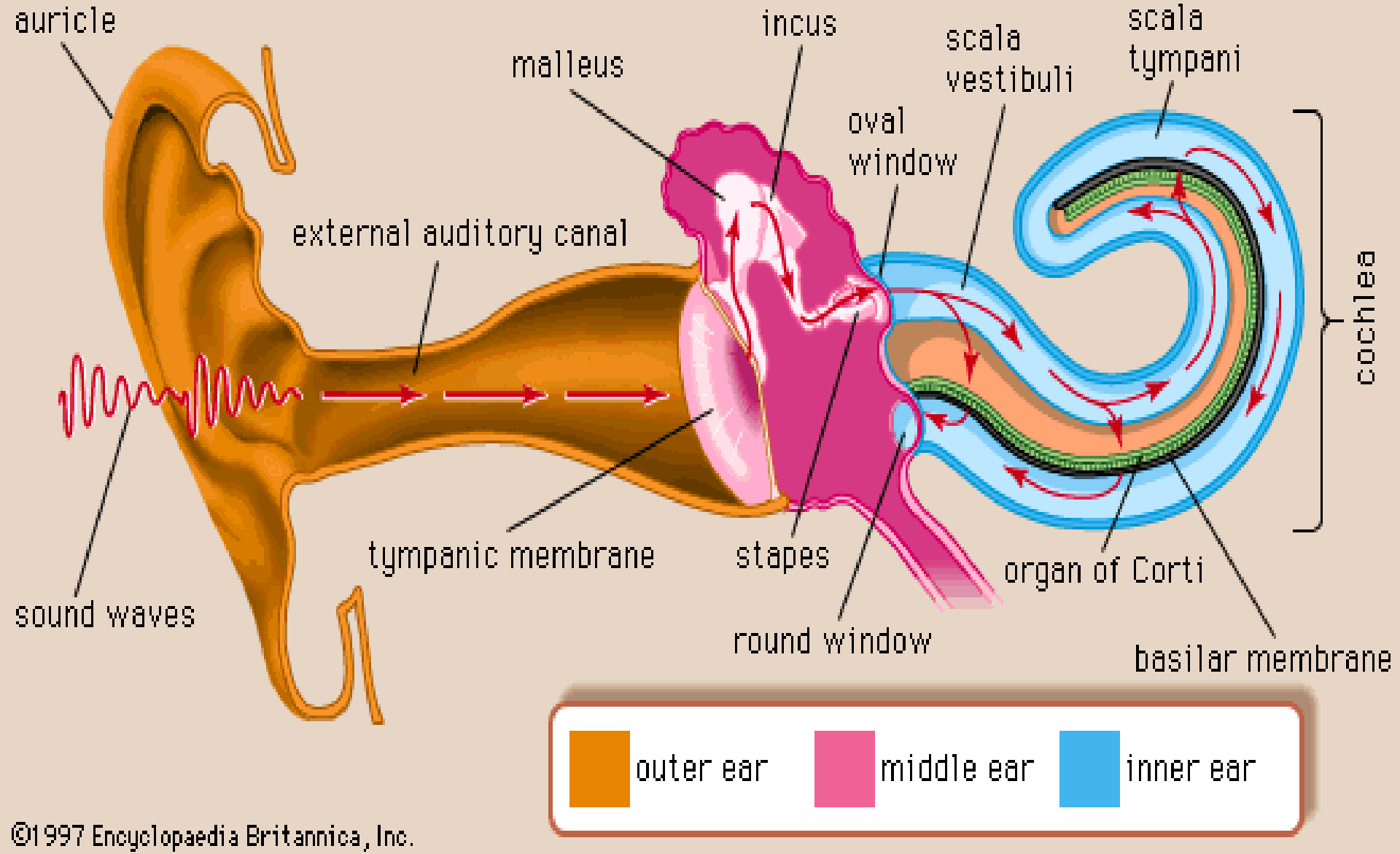
HEARING LOSS PREVENTION

DID YOU KNOW……?

- Noise-induced hearing loss is the number one occupational disability
- It is generally painless
- It is progressive over time
- It is permanent
- IT IS PREVENTABLE!!!



HOW DO WE HEAR?



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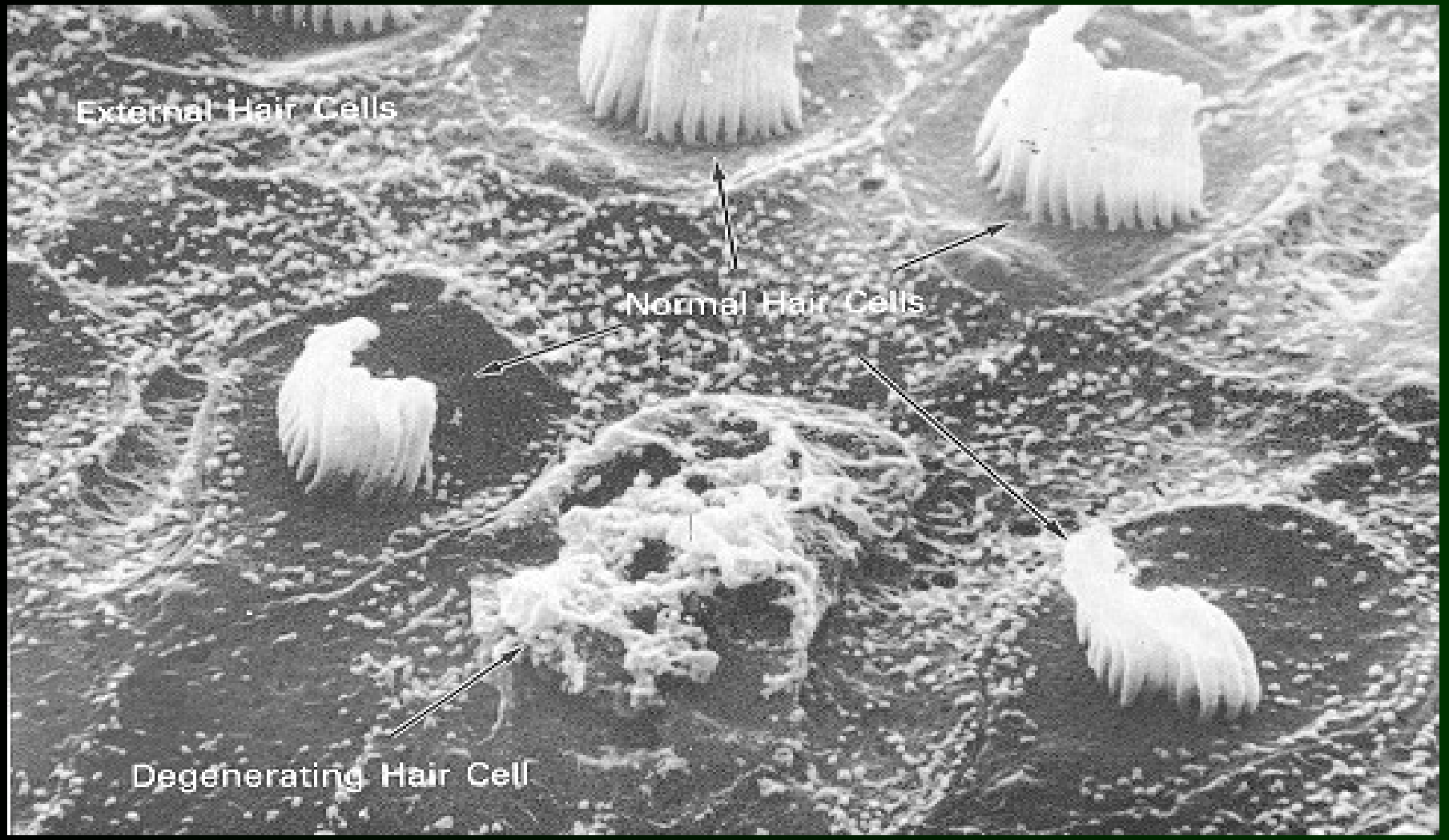
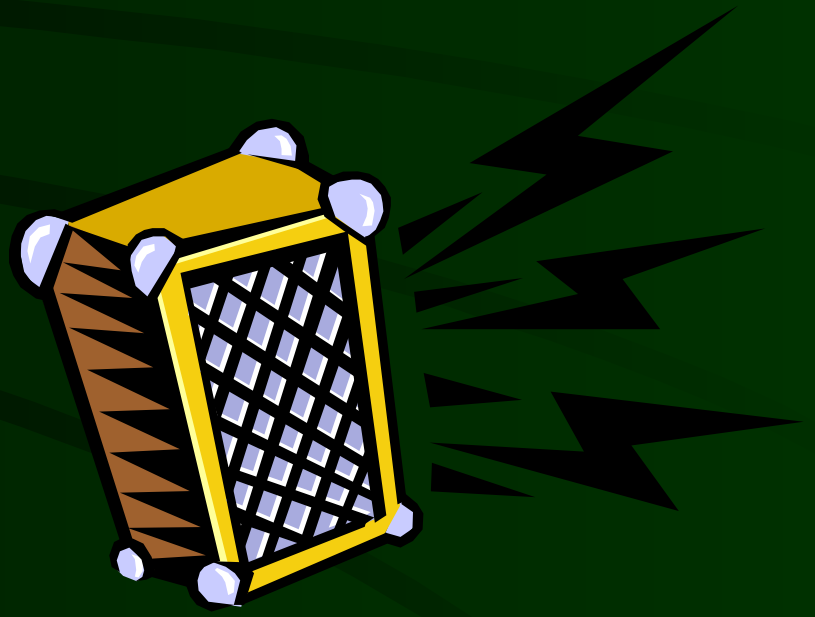
SOUND RECEPTORS

DAMAGED HAIR CELLS



WHAT IS NOISE?

- Simply stated... noise is any unwanted sound



WAYS TO CHARACTERIZE OF NOISE

- ***FREQUENCY***- perceived as pitch
- ***INTENSITY***- perceived as loudness
- ***NATURE***- steady-state vs. impulse/impact
- ***DURATION***- length of time exposed

Noise Induced Hearing Loss

- Initially, exposure to noise causes a loss of sensitivity to high frequency (high pitch) sound.
- Continued exposure results in damage to mid frequency region as well.
- One can experience progressive high frequency hearing loss and not be aware of it until it becomes severe (doesn’t affect loudness perception).

HOW CAN IT HAPPEN?

- ACOUSTIC TRAUMA – ONE TIME EXPOSURE TO LOUD SOUND

OR

- DAILY EXPOSURES TO MODERATELY LOUD SOUNDS

HOW DO WE KNOW SOMETHING IS TOO LOUD?

- Could use 3 foot rule
  - If you have to raise your voice to be heard by someone standing within 3 foot (arm's length) then the level is most likely above the hazardous noise level

or

  - Objectively measure loudness with proper equipment

When is noise scientifically defined to be a hazard?

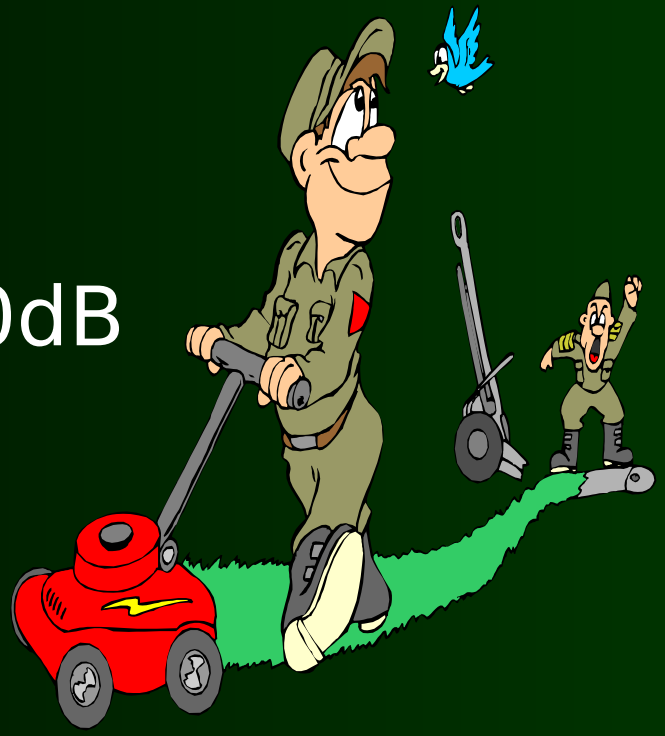
-Duration of exposure, intensity (volume) of sound, repeated exposure, individual susceptibility

-85dBA for steady-state noise sources

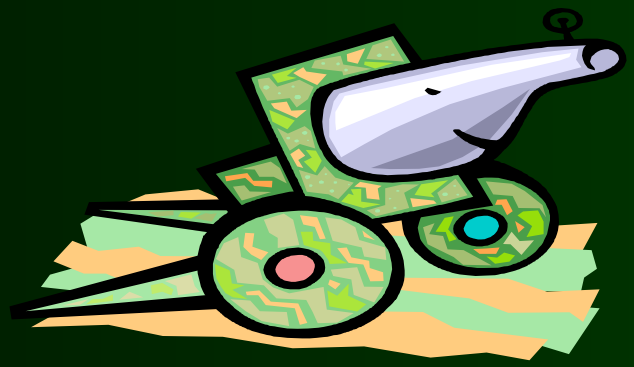
-140dBP for impulse/impact noise sources

Steady-State Noise Examples

- Rustling Leaves 20dB
- Conversation 60dB
- Automobile 70dB
- Alarm Clock 80dB
- Screaming Child 90dB
- Pneumatic Drill 100dB
- Helicopter 110dB
- Live Concert 130dB



Impulse Noise Examples



- M16, blanks w/suppressor 147dB
- Vulcan XM197 20mm 159dB
- Shotgun 12 gauge 160dB
- Machine Gun 60 cal 165dB
- Launcher, M20-A 35” Rocket 171dB
- TOW Missile 180dB

Loss of hearing sensitivity due to hazardous noise exposures from either steady state noise or impulse noise does occur even before we can measure the change!....

And it does carry neg consequences!!!

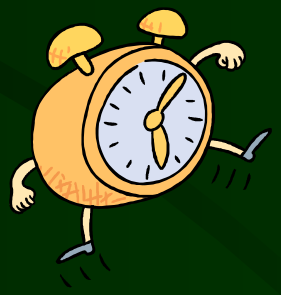
PTS vs. TTS

- A permanent threshold shift (PTS) vs. a temporary threshold shift (TTS)
- Bounce-back effect…not complete recovery
- Immediate medical referral (Audiology / ENT)

Permanent Effects of Noise Induced Hearing Loss

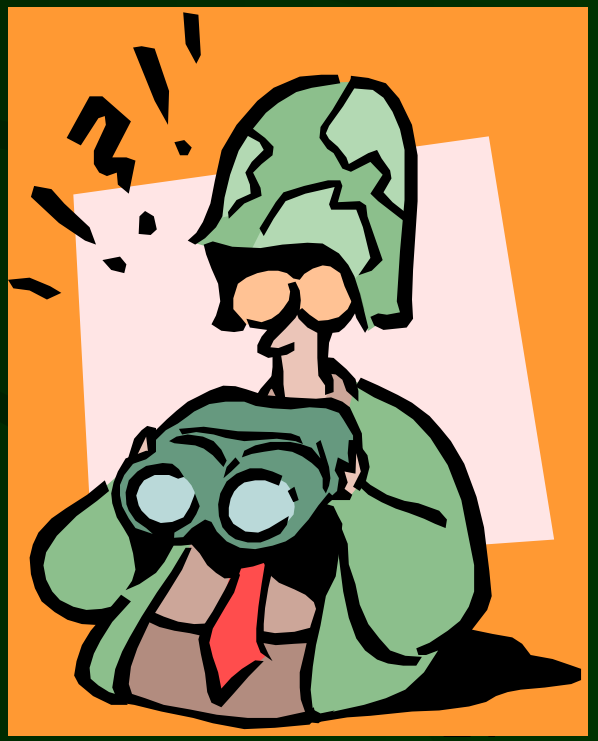
-Difficulty understanding conversation, particularly in background noise... high frequency hearing loss affects ability to hear consonants. Quality of environmental sound is diminished.

-”Ringing in Ears” - tinnitus



WHAT ABOUT EFFECTS ON MISSION ???

- Hearing vs. vision in tactical environment
  - Darkness
  - 360 degrees
  - 24/7



What About the Soldier who Can't Hear Within Normal Hearing Range?

- A normal listener can hear
  - footsteps at 100 meters
  - voices at 180 meters
  - rifle bolt closing at 1000 meters
- A person with a hearing loss can hear
  - footsteps at < 1 meter
  - voices at 32 meters
  - rifle bolt closing at 46 meters

THINK ABOUT IT…

-Listening posts

-Walking point on patrol

-Call for fire

-Urban Warfare

Annual Hearing Testing

- Why do annually?
  - Feedback *BEFORE* it becomes a problem….not five years down the road when it definitely is a problem
- What is your score???
  - Are you practicing good hearing conservation or aren’t you???

BOTTOM LINE

- **If you are exposing yourself to hazardous noise levels unprotected…it's not a matter of *whether* you will develop hearing loss but *when* you will develop hearing loss…the odds are *VERY RARELY* beaten.**

HEARING PROTECTION

- The only thing standing between you and a potential permanent hearing loss!!!!

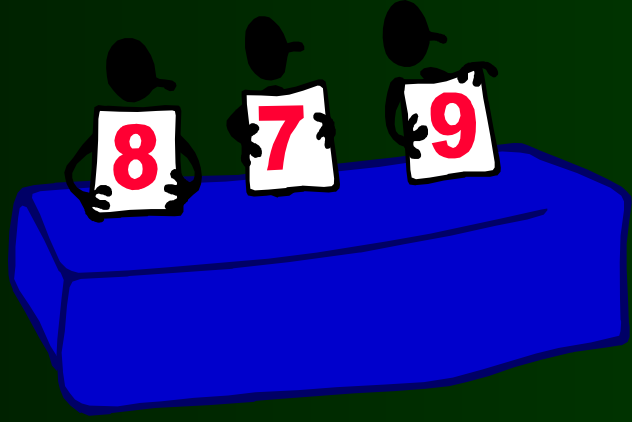
But I Can't Wear Hearing Protection Because……

- My ears will become infected
- They hurt my ears
- I can't hear to do my job
- I can't hear sounds needed to hunt, etc., etc.
- Thinking short-term instead of long-term

Approved Types of HPD's

- Earplugs
  - Pre-formed
  - Hand-formed
- Noise Muffs
- Helmets

NOISE REDUCTION RATING (NRR)



- All hearing protection devices have a Noise Reduction Rating (NRR)
- Field testing suggests that the actual NRR is approximately half of what is listed on the package

PRE-FORMED EARPLUGS

- **Single Flange:**
  - (NRR)=23dB
  - 5 color-coded sizes:
    - **White (Extra Small)- 10% of the population**
    - **Green (Small)- 25%**
    - **Orange (Medium)-30%**
    - **Blue (Large)- 40%**
    - **Red (Extra Large)- 25%**

FITTING TECHNIQUE

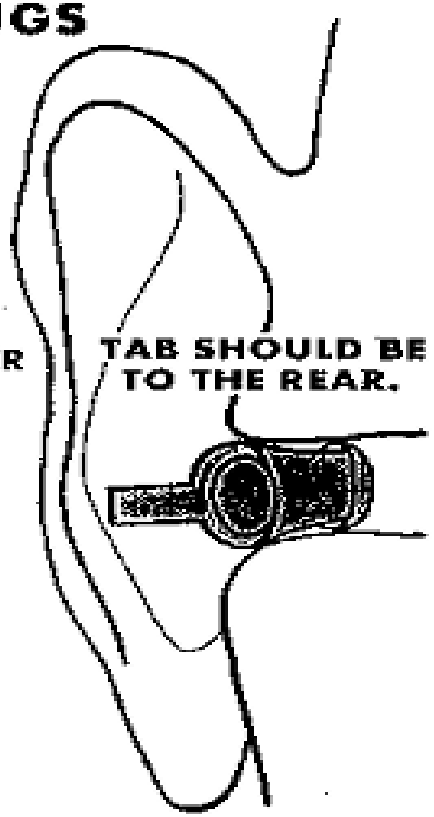
FOR MAXIMUM PROTECTION AND COMFORT, INSERT SINGLE FLANGE EARPLUGS AS FOLLOWS:

1. MAKE THE EAR CANAL ACCESSIBLE BY REACHING OVER HEAD WITH OPPOSITE HAND AND PULLING EAR OUTWARD.

2. GRASP PLUG TAB BETWEEN THUMB AND FOREFINGER AND INSERT PLUG INTO EAR CANAL.

3. PUSH AND TWIST PLUG TOWARD REAR-CENTER OF HEAD UNTIL SEAL IS MADE.

4. IF A GOOD SEAL IS NOT OBTAINED, USE SMALLER OR LARGER SIZE. SINGLE FLANGE PLUGS ARE AVAILABLE IN FIVE SIZES- EX. SMALL , SMALL, MEDIUM, LARGE, AND EX. LARGE.



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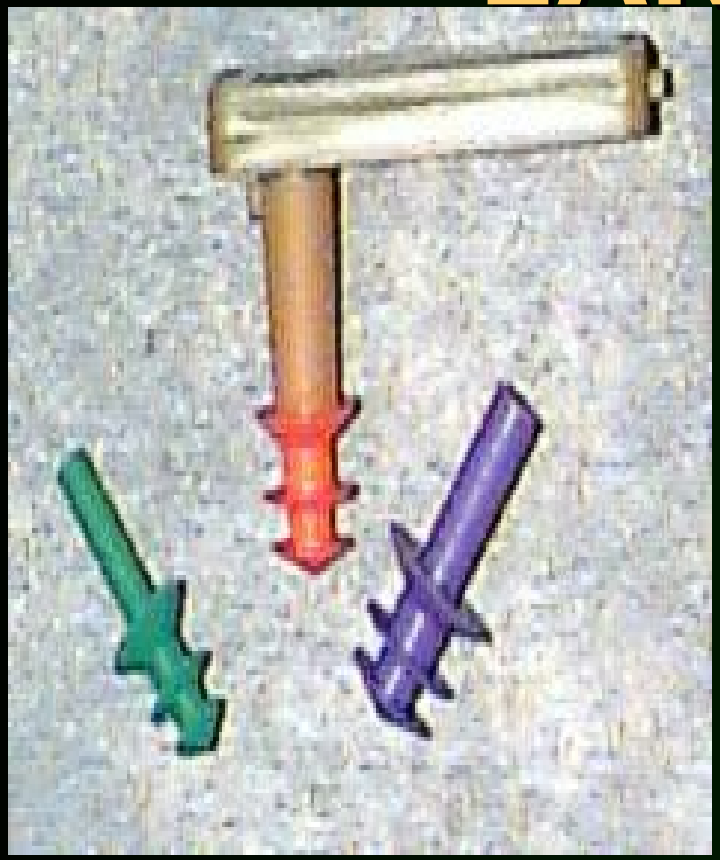
PRE-FORMED EARPLUGS



- **Triple Flange:**
  - NRR= 26dB
  - 3 color coded sizes:
    - **Green (Small)= 10% of the population**
    - **Orange** (Medium)=80%
    - **Blue (Large)= 30%**

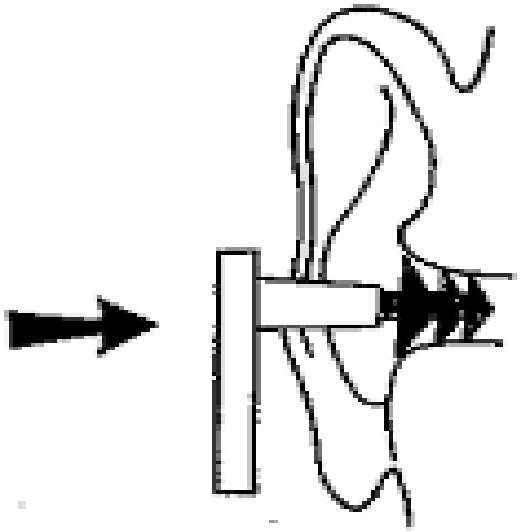
FITTING TECHNIQUE

EARPLUG SEATING DEVICE AND CARRYING CASE

TRIPLE-FLANGE EARPLUGS (INSERTION INSTRUCTIONS):

A. INSERT STEM OF PLUG IN OPEN END OF CASE LID.

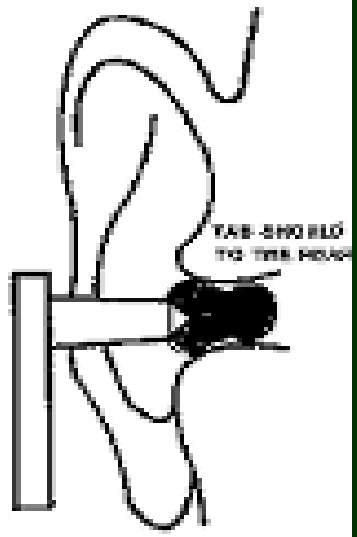
B. PUSH AND WIGGLE PLUG TOWARD REAR-CENTER OF HEAD



SINGLE-FLANGE EARPLUGS (INSERTION INSTRUCTIONS):

A. GRASP PLUG TAB BETWEEN THUMB AND FOREFINGER AND INSERT INTO EAR CANAL.

B. USE POINTED END OF CASE LID TO IMPROVE SNUG FIT.

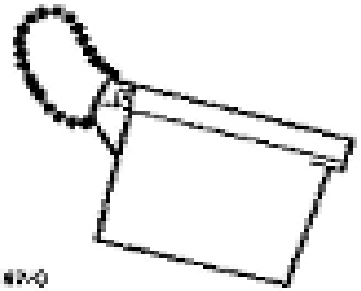


GENERAL INSTRUCTIONS:

A. WHEN NOT IN USE, KEEP PLUGS IN CARRYING CASE.

B. ENSURE THAT PLUGS ARE CLEANED WITH SOAP AND WATER AND ARE DRY WHEN RETURNED TO THE CASE.

C. WEAR YOUR EARPLUG CARRYING CASE (WITH EARPLUGS) AS PART OF YOUR WORK UNIFORM. THEY ARE PART OF YOUR PERSONAL ISSUE AND ARE TO BE RETAINED UPON CHANGE OF STATION.



CASE AND EARPLUG INSERTER, PLASTIC, NONREFLECTIVE, 3M, NSN 6515-01-100-1870

Characteristics Of A Good Pre-formed Earplug Fit

- Voices sound muffled
- “Vacuum” effect
- Comfortable
- Single flange tab facing toward back of ear
- Largest flange of triple flange is flush against ear canal opening

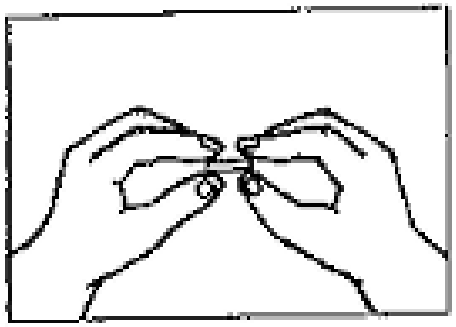
HAND-FORMED EARPLUGS

- Noise Reduction Rating (NRR)=29dB

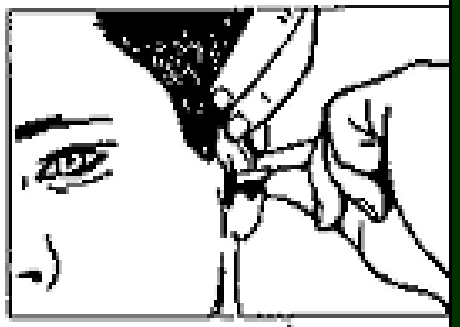
Fitting Technique

FOR MAXIMUM EFFECTIVENESS AND COMFORT INSERT FOAM EARPLUGS (NSN 6515-00-137-6345) AS FOLLOWS: IMPORTANT – HANDS AND PLUGS SHOULD BE CLEAN PRIOR TO USE. DO NOT USE WHERE HAZARDOUS CHEMICALS OR MATERIALS COULD BE TRANSFERRED TO PLUG.

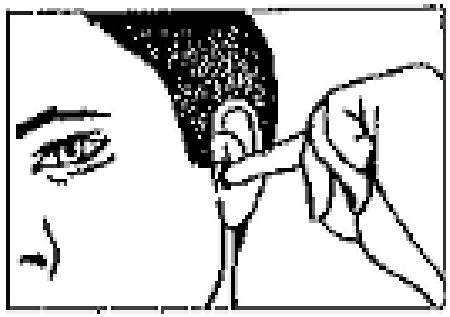
1 WITH BOTH HANDS GRASP THE ROUND SIDE OF THE PLUG. SLOWLY ROLL AND COMPRESS THE PLUG INTO A VERY THIN, CREASE-FREE CYLINDER.



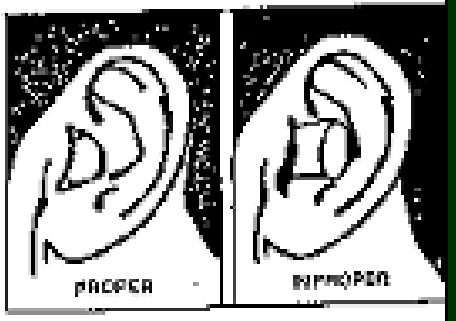
2 WHILE COMPRESSED, INSERT THE PLUG WELL INTO THE EAR CANAL. FITTING THE PLUG IS EASIER IF THE OPPOSITE EAR IS PULLED OUTWARD AND UPWARD DURING INSERTION.



3 WITH FINGERTIPS, GENTLY HOLD THE PLUG IN PLACE UNTIL IT BEGINS TO EXPAND AND BLOCK THE NOISE. QUALITY OF FIT MAY BE ESTIMATED BY OCCLUSION.



4 EARPLUG FIT CAN BE TESTED IN THE PRESENCE OF NOISE BY ALTERNATELY COVERING AND UNCOVERING THE EARS WITH TIGHTLY PRESSED PALMS. WITH PROPERLY FITTED PLUGS THE NOISE LEVELS SHOULD SEEM NEARLY THE SAME WHETHER OR NOT THE EARS ARE COVERED. KEEP PLUGS CLEAN BY WASHING IN MILD SOAP AND RINSING THOROUGHLY IN WATER. DISCARD IF DISCOLORATION OR DISTORTION OCCURS AFTER CLEANING.



Circumaural Noise Muffs

Noise Reduction Rating (NRR)=23dB

Fitting Technique

- Noise muffs should seal around the ear
- Replace ear cushions when cracked or worn
- Certain types of muffs allow placement of the headband on top of the head, behind the head, or under the chin

Care and Maintenance of all HEARING PROTECTIVE DEVICES

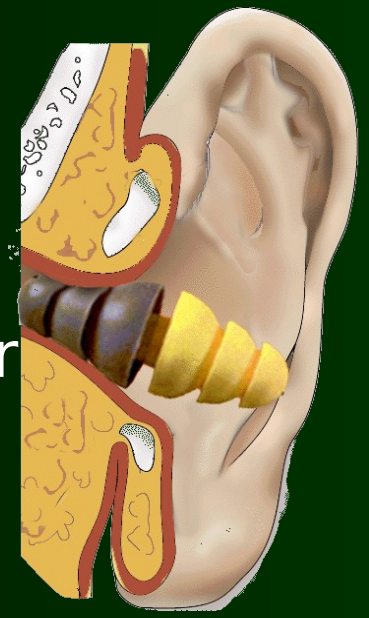
- Keep clean with mild soap and water and dry before using
- Replace when material hardens/cracks or does not clean
- Check for cracks on earphone seals, headband tension and replace as needed

Helmets: For Specific Operational Uses

- Aviators, aviation crews
- Tankers
- Amphibious vehicle crew members

COMBAT EARPLUGS

- Insert YELLOW plugs for weapons fire in dismounted mode.
- Insert OLIVE DRAB plugs for steady state noise in and around aircraft, noisy vehicles and watercraft, etc.



- Keep filter holes free of earwax and other debris.
- Check proper insertion for slight tension by gently tugging on plugs.
- Ensure that plugs are cleaned with soap and water and dry when returned to case.

Where to get Hearing Protection

- Pre-formed – fitting done at Thomas Moore Health Clinic on walk-in basis
- All other types provided by unit and should be included in budget

One more time…When do I need to wear protection?

- Steady state noise measured at 85dBA or greater

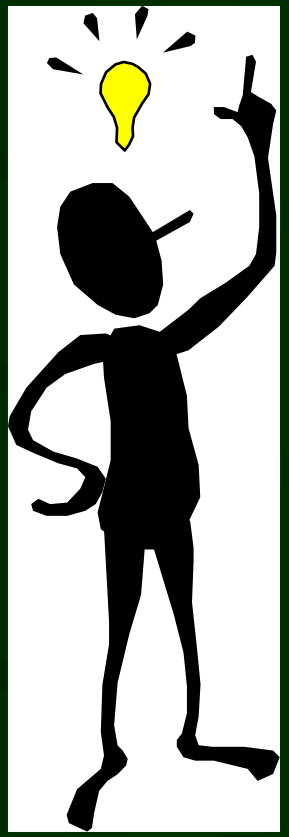
- Impulse noise measured at 140dBA or greater

Are HPDs always enough?

- Some military noise exposure may exceed the protection offered by HPDs
- Synergistic effects
- Permanent damage can be minimized with HPD use

OTHER PROTECTIVE MEASURES

- Administrative Controls
- Double protection
- Medical intervention???



ADMINISTRATIVE CONTROLS

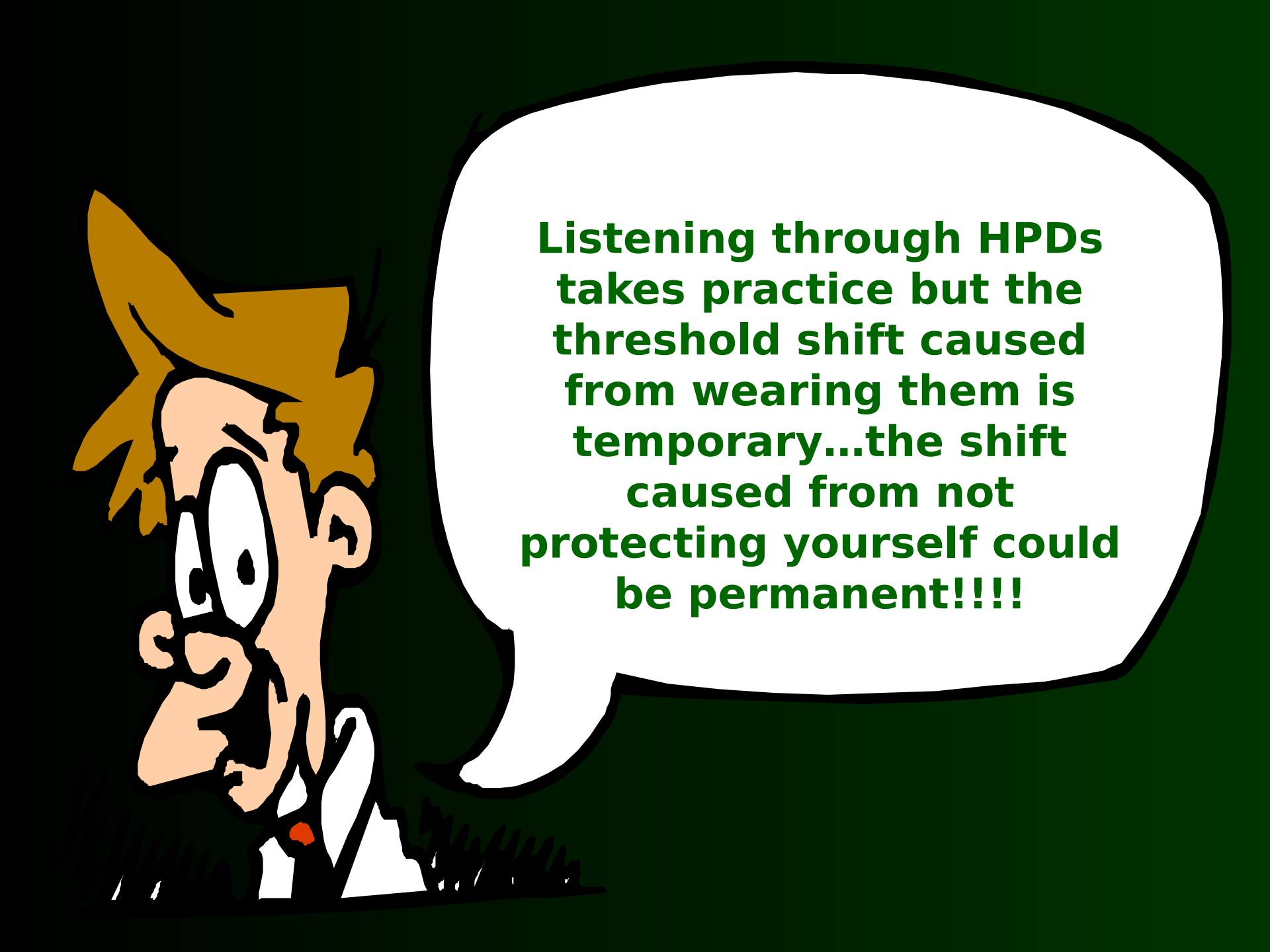
- Limit exposure time by implementing shift work schedules

DOUBLING UP!

- Steady state noises 120dBA or greater
- Use of insert earplugs and circumaural earmuffs together

Medical Research (*on the horizon)*

- Hazardous exposure initiates inner ear oxidative process which results in hair cell death cycle
- New medication may be able to ***limit*** permanent damage by arresting oxidative process
- Time sensitive
- NOT A SUB FOR HPDs!


Listening through HPDs takes practice but the threshold shift caused from wearing them is temporary…the shift caused from not protecting yourself could be permanent!!!!

TO SUMMARIZE……

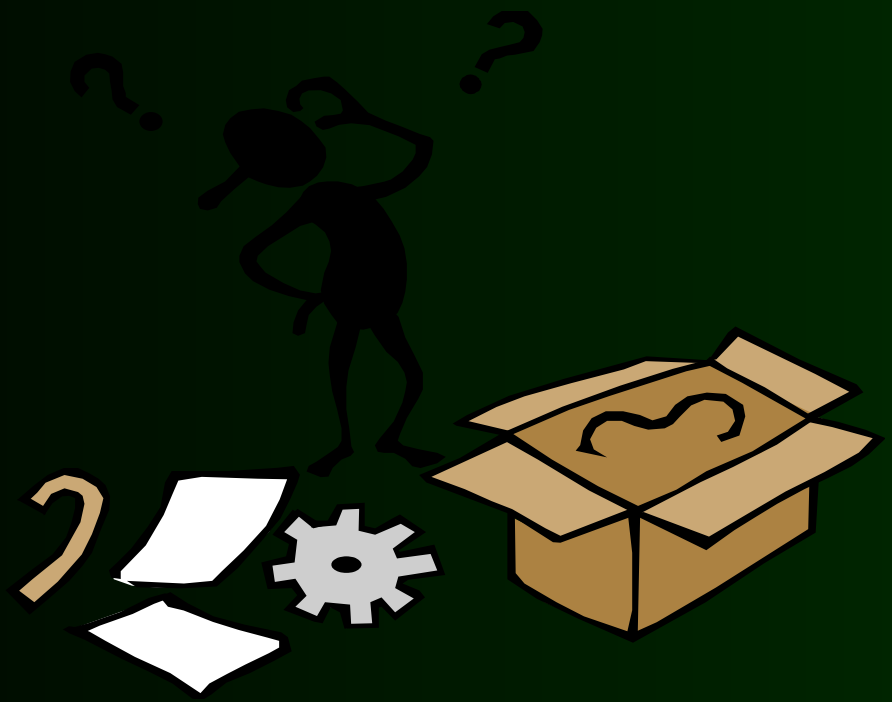
- **HEARING LOSS HAPPENS!**

- **Noise induced hearing loss is 100% preventable**

- **Your hearing health starts with YOU while at work or home**

- **If YOU don’t protect it YOU will lose it**

QUESTIONS??



Fort Hood Hearing Conservation Section

285-6186/6311